WHAT IS CLAIMED IS:

1. A method of preparing a compound of formula

$$fac\text{-}[M(CO)_3(OH_2)_3]^+ \qquad (I)$$

wherein M is Mn, ^{99m}Tc, ^{186}Re or ^{188}Re,
comprising reacting a metal in permetallate form with carbon monoxide and a reducing agent, wherein a mixture of a basic borate buffer and a reducing agent soluble in water but not substantially decomposed by water is solved in a water containing solvent system containing a solution of the metal in permanganate, pertechnetate or perrhenate form in the presence of carbon monoxide.

2. The method of claim 1 wherein said mixture further includes a stabilizing agent.

3. The method of claim 1 wherein said reducing agent is KBH_4.

4. The method of claim 1 wherein said mixture further includes lactose.

5. The method of claim 1 wherein said mixture further includes L-tartaric acid.

6. A method of preparing a compound of formula

$$fac\text{-}[M(CO)_3L_x]^n \qquad (II)$$

wherein:

M is Mn, ^{99m}Tc, ^{186}Re or ^{188}Re;

L_x is a multidentate ligand; and

n is a charge of the ligand L_x increased with one + charge;

comprising reacting a compound of formula (I) prepared according to claim 1 with ligand L_x.

7. The method of claim 6, wherein the reaction with ligand L_x takes place in the presence of a halide.

8. The method of claim 6 wherein L_x comprises an aminopolycarboxylate.

9. The method of claim 6 wherein L_x comprises a biologically active substrate selected from the group consisting of amino acids, peptides, proteins, sugars, small receptor binding molecules and body cells.

10. The method of claim 6 wherein said method is performed between about 20°C and 100°C.

11. The method of claim 6 wherein said method is performed at about 75°C.

12. The method of claim 8 wherein said aminopolycarboxylate ligand is selected from the group consisting of diethylenetriamine-pentaacetic acid (DTPA), ethylenediaminetetraacetic acid (EDTA), 1,4,7,10-tetraazacyclododecane-1,4,7,10-tetraacetic acid (DOTA), iminodiacetic acid (IDA), nitrilotriacetic acid (NTA), and triazacyclononanetriacetate.

13. The method of claim 8 wherein said ligand is not bidentate.

14. The method of claim 8 wherein said ligand is tridentate.

15. A compound of formula

$$fac\text{-}[M(CO)_3L_x]^n \qquad (II)$$

wherein:

M is Mn, ^{99m}Tc, ^{186}Re or ^{188}Re;

L_x is a multidentate aminopolycarboxylate ligand; and

n is the sum of the charge of the ligands L_x.

16. The compound of claim 15, wherein L_x is not a bidentate ligand.

17. A kit for carrying out the method of claim 1, comprising a lyophilized formulation including a basic borate buffer and a reducing agent soluble in water but not substantially decomposed by water, said mixture being sealed in a container having a headspace comprising carbon monoxide.

18. The kit of claim 17 wherein said headspace is substantially pure carbon monoxide.

19. The kit of claim 17 wherein said reducing agent is KBH_4.

20. The kit of claim 17 wherein said formulation further includes lactose.

21. The kit of claim 17 wherein said formulation further includes L-tartaric acid.

22. The kit of claim 17 further including a metal M which is Mn, ^{99m}Tc, ^{186}Re or ^{188}Re.

23. A kit for carrying out the method of claim 6, comprising a lyophilized formulation including a basic borate buffer, a reducing agent soluable in water but not substantially decomposed by water and a metal M which is Mn, ^{99m}Tc, ^{186}Re or ^{188}Re.

24. The kit of claim 23 wherein said reducing agent is KBH_4.

25. The kit of claim 23 wherein said formulation further includes lactose.

26. The kit of claim 23 wherein said formulation further includes L-tartaric acid.

27. The kit of claim 23 further comprising a ligand L_x which is a multidentate aminopolycarboxylate ligand.

28. The kit of claim 27 wherein L_x is not a bidentate ligand.